The American Fertilizer

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See Page 27

...THE...

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"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

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Pasture Notes

Compiled by R. H. LUSH

Pasture Specialist, The National Fertilizer Association.

Poultry Pastures

Good pasturage is basic in poultry production. Select well-drained soil near the poultry house, fertilize it well with 20 per cent superphosphate, and if the soil is light add some potash as well Three or four bags of fertilizer per acre will prove advantageous. Then sow it down to oats, wheat, or rye, using twice the rate used for grain production. *The Southern Planter, October, 1939.*

Soil Conservation

"As a result of failing to save the organic matter and soluble nutrients in the manure, the livestock farmer may actually be depleting his farm more rapidly and allowing erosion to proceed more rapidly than his neighbor who is practicing grain farming and seeing that all crop residues are returned to the soil and used as cover and as a source of organic matter. In either system, with no significant losses of soil by erosion, soil amendments such as limestone, phosphates, and potash are necessary to replace the minerals which are removed from the farm by the sale of grain, livestock, and milk," says A. T. Semple, head, pasture section, soil Conservation Service. Other interesting articles on establishing pastures are contained in the September issue of *"Soil Conservation."*

Drying Hay

The average total cost of producing one ton of baled dried grass in 20 centers in England in 1937 and 1938 was just under $28.00. Five types of driers were used. The cost is about one dollar less than the same feeding value, exclusive of carotene content, could be purchased in the form of concentrates. The future of grass drying will depend upon relative costs of concentrates, increase in uniformity of drying, lower costs by field wilting, and improvement of inferior pastures. *Fodder Conservation, Agricultural Research Council Report No. 5, London, 1939.*

Give Good Grass a Chance

Most old pastures have one or more good pasture species already growing in them. Often an application of 200 to 600 pounds of superphosphate or complete fertilizer to the acre, along with mowing and controlled grazing, will change the pasture vegetation from a poor cover of practically all weeds to a good cover of native grasses and legumes. *G. A. Hale, Southern Agriculturist, November, 1939.*

Lime and Phosphate Make the Difference

Lime and phosphate make the difference between good and poor pastures. An experiment at Pennsylvania State College shows that an unfertilized and unlimed meadow produced 871 pounds of cured hay per acre, which an adjoining acre receiving lime and phosphate yielded 2,686 pounds.

The Connecticut Experiment Station has found that when barn-fed dairy cows have access to good pasture, they can produce 100 pounds of milk for 51 cents, whereas, it cost 94 cents to produce 100 ounds of milk when on poor pasture. More lime and phosphate on the land means stronger bodies and better health of the people who live there. The true value of plants and animals varies with the fertility of the soil that succors them. *The Southern Planter, November, 1939.*

Alabama

AAA Booms Pasture Improvement. Alabama farmers established 23,114 acres of im-

proved pasture in 1938 under the AAA program, compared to 2,800 in 1937.

Superphosphate and Vetch. Hairy vetch produced about 20 per cent less growth when superphosphate and triple superphosphate came in contact with seed inoculated with a commercial culture than when the fertilizer was mixed with the soil before planting, and made 158 per cent more growth when superphosphate was mixed with soil before adding soil inoculant than when it came in contact with the soil inoculant. Injury by superphosphate in contact with inoculated seed was party reduced or counteracted by dolomite. Fertilizer or inoculation increased the nitrogen content of vetch plants; when both were used, the highest percentage of nitrogen and the most vegetative growth were obtained. Most of the nitrogen was in the tops. *T. H. Rogers and D. G. Sturkie in Jour. Amer. Soc. Agron., 31, No. 2, pp. 141-148, 1939.*

Arkansas

More Pounds of Beef per Acre. Coastal plain soil in Arkansas depleted by cropping and soil erosion was converted to Bermuda grass and legume pasture. Fertilizer treatment and good management have increased the productive power of this pasture from 150 to 440 pounds of beef per acre during a period of four years. Similar studies on Lintonia silt loam soil resulted in a change from 150 pounds of beef per acre to 589 pounds in six years of this treatment. No other system of crop rotation and fertilization has resulted in such marked soil reclamation.

Connecticut

Fertilizer for Rye. More rye pasture is a cure for empty barns and high spring feed prices, according to J. S. Owens, crops specialist of Connecticut. Rye is effective in reducing winter and spring erosion and makes an excellent nurse crop for spring seedings. Lime and superphosphate can be applied in the fall or spring, and potash in the spring, but for the greatest amount of fall pasture from the rye an application of manure or about 300 pounds of a high-nitrogen fertilizer, such as an 8-8-8 grade, is justified. *New Haven County Farm Bureau News, September 1, 1939.*

Florida

Nitrogen Helps Grass. It is important to increase the nitrogen content of Florida and other southern soils to augment grass growth. Fertilizer studies with carpet grass on five soil types indicate that the carrying capacity of this grass may be increased by more than 100 per cent with a light application of complete fertilizer and subsequent nitrogen applications. On soils where clovers can be grown, it seems practical to furnish the soil with lime, phosphate, and potash, so that the clovers will supply the nitrogen for current and subsequent grass growth. *R. E. Blaser, Assistant Agronomist, Florida, in "Better Crops with Plant Food," August-September, 1939.*

Georgia

Seed Treatments. Bahia grass seed treated ten minutes in concentrated technical sulphuric acid germinated 52 per cent in eight days, and untreated seed 0.3 per cent in three weeks. Scarification with crude sulphuric acid for 45 to 60 minutes proved as effective, cheaper, and less dangerous. Scarifying Dallis grass seed with concentrated (technical grade) sulphuric acid for five minutes or with 35 per cent sodium hydroxide aided germination. Five- and ten-minute treatments with either 50 per cent hydrochloric acid or 35 per cent sodium hydroxide increased the germination rate of centipede grass. Bermuda grass responded best to concentrated hydrochloric acid for five minutes, but vasey and carpet grass gave reduced germination with all treatments. Not only different grasses but different lots of the same grass vary in response to treatment. *G. W. Burton in Jour. Amer. Soc. Agron., 31, No. 3, pp. 179-187, 1939.*

How to Save Hay. A thick seeding of a small grain-legume mixture on well-prepared land will save much hay on Georgia farms, according to E. D. Alexander. If the land is poor, a good application of manure or a heavy application of a good cotton fertilizer should be made. Even on good land, if manure is not used, 200 to 400 pounds of fertilizer should be applied. *The Progressive Farmer, October, 1939.*

Illinois

Superphosphate for Illinois Pastures. Harrowing pastures to spread manure, clipping weeds, liming, and discing for reseeding are fall practices recommended by R. F. Fuelleman of the University of Illinois. He recommends adding superphosphate in the spring under Illinois conditions. *Country Gentleman, October, 1939.*

Kansas

Deferred Grazing. By deferring grazing until June 15th each year, the carrying capacity per acre of Kansas bluestem pasture was increased about 25 per cent, and the animal gains

by 33 per cent. In their leafy stages, the bluestem grasses were found to contain adequate crude protein and minerals for nutritional requirements and satisfactory gains.

Testimonial. One hundred pounds of concentrated superphosphate per acre made his sweet clover grow twice as tall and five times as thick, says Steve Smith of Cedarvale, Kansas. As a result, Mr. Smith plans to use fertilizer with the sweet clover he will seed next spring.

KENTUCKY

Diversification Pays. Highest returns were found on farms that had several sources of income, where good livestock were raised, where lime and phosphate made good crop yields, and where expenses were kept low according to a Kentucky study last year in the Pennyroyal Region. More attention should be given to good pasture, including small grain, grasses, and clovers for grazing in early spring and late fall, as well as in summer, so that more cattle and sheep can be raised, it was concluded.

Lime Not Fertilizer. In an article on the use of lime, E. J. Kinney, professor of farm crops at the University of Kentucky, points out that it is not a fertilizer. It cannot be of much benefit on soils deficient in phosphorus or potash or any other mineral element of plant food. On most soils in the south, phosphorus is deficient and should be used in connection with lime.—Southern Agriculturist, October, 1939.

MARYLAND

Too Much Grazing. According to John Magruder, Specialist in Agronomy, permanent pastures in Maryland are gradually becoming less productive because of continuous grazing. He points out that September is a good month to lime and fertilize pasture land as the undesirable weeds and grasses have been killed off and the desirable pasture grasses are making new growth after the intense heat of summer. Good pasture land responds to fertilizer, lime, and manure better than poor land and should be improved first. An application of 400 pounds per acre of 4-12-4 fertilizer once every two years during late September will maintain the grass in a thrifty condition where good management practices are followed.—The Maryland Farmer, September, 1939.

MISSISSIPPI

Fertilized Hop Clover. A fall application of 200 pounds 20 per cent superphosphate increased the yield of low hop clover hay 1,518 pounds or 133.4 per cent, and protein 197 pounds at West Point, Mississippi. A 400-pound application gave 2,277 pounds increase or three times as much as the untreated clover plot. The increase in crude protein yield was 323 pounds or the equivalent of 790 pounds of cottonseed meal for about $4.00 invested in fertilizer. Larger amounts did not give such profitable returns. Low hop clover is universally recommended for pastures in Mississippi, and these results show it can be profitably fertilized.—*Mississippi Farm Research, Vol. 2, No. 10.*

MISSOURI

Livestock Prefers Improved Feed. Animals will recognize soil treatment effects as well as improvement in the crop quality long after the soil treatment may have been forgotten. Examples of this are pointed out in Missouri by Dr. William A. Albrecht. Hogs on the farm of Cliff Long, Johnson County, ate corn from the limed and far side of a field first. Cows of E. M. Poirot, Golden City, when turned on spring barley grazed first on strips that had received a double application of superphosphate. That with a light amount of superphosphate was left ungrazed to the drill line. Mr. Poirot states that a small area of virgin prarie pasture limed 11 years earlier attracts his cattle. He says, "The cattle have stayed on this smaller, limed area this spring rather than grazing over the entire 190 acres."—*"Better Crops with Plant Food," August-September, 1939.*

NEW JERSEY

Spring Nitrogen Applications. Nitrogen fertilization in early spring increased the growth of timothy in New Jersey experiments, but did not appreciably change its protein content at the normal time of hay harvest. Soluble nitrogen fertilizers equivalent to 125 pounds per acre of sodium nitrate applied in mid-June increased the crude protein content of hay from 6.45 to 7.74 per cent in ten days after treatment, and from 5.35 to 6.74 per cent in 20 days after, and the aftermath by about 50 per cent.

Lime and Pastures. Tests on a wide variety of soils have shown that, although lime used alone rarely produced great benefits on pasture, its use in conjunction with fertilizer has proved an exceedingly profitable treatment, reports Howard B. Sprague, Agronomist of the New Jersey Agricultural Experiment Station. Autumn is the best season of the year to lime pastures.

(Continued on page 22)

Better Returns From Your Fertilizer Dollar*

By DR. RICHARD BRADFIELD

Department of Agronomy, Cornell Agricultural College, Ithaca, N.Y.

EVERY man who buys fertilizer wants to get the highest possible returns from every dollar spent. As compared to the time of the outbreak of World War No. 1, this country now has a much better supply of fertilizer materials. Then most of our nitrogen was secured from nitrate of soda, sulphate of ammonia and organic by-products. Nitrogen averaged to cost about $2.85 a unit. (A unit is 1 per cent of a ton; in other words, 20 pounds of nitrogen.) Since that time great progress has been made in fixing nitrogen from the air for use as fertilizer. If the time should ever become necessary, it is probable that the fertilizer needs of this country could be met in that way. At present the cost of nitrogen is about $1.34 a unit, which is somewhere near half the cost 25 years ago.

Before the World War we imported most of our potash from Central Europe. Now this country provides three-quarters of the potash we need, and we have supplies which, if necessary, can meet all demands. At present, potash is still coming to this country from France. The cost of potash is now over 25 per cent below pre-war costs.

This country has a good share of the world's supply of phosphate rock, and without considering relatively new deposits discovered in the West, the supply in southeastern states is adequate for our fertilizer needs for 1,000 years.

Fewer Analyses

In recent years farmers have been using more mixed fertilizer. Twenty-five years ago there was little or no effort toward standardization of analyses and the large number of fertilizer analyses offered to farmers was confusing and unnecessary. Now colleges of agriculture and manufacturers have agreed that eleven fertilizer ratios are all that we need, and there has been a definite trend toward fewer analyses offered for sale, thereby permitting a very definite saving in manufacture.

Along with the trend toward fewer analyses, a ton of fertilizer averages to contain more plant food than it once did. It is generally agreed that a fertilizer should contain not less than 20 per cent of plant food (for example a 5-10-5). Most mixed fertilizers now sold meet this requirement and many exceed it.

Freight charges on a ton of low analysis fertilizer are just as high as they are on concentrated fertilizer. Besides that, why not save our backs? If we can get the same plant food in one ton that we formerly bought in two, there is just so much less lifting to be done.

A 5-10-5 fertilizer and a 10-20-10 fertilizer have the same ratio of nitrogen, phosphorus and potash; but it is possible to save about 25 per cent in cost when the more concentrated fertilizer is manufactured and sold. Experiments have shown that in most cases equally good results are secured from 1,000 pounds of 10-20-10 as from a ton of 5-10-5. In a very few cases less concentrated fertilizers may contain some minor elements that will help the growth of plants where they are needed, but this applies in only a few cases and usually these minor elements can be added in a more economical way.

How to Apply Fertilizer

Experiments have shown that best results are secured by applying the fertilizer as close to the seed as can be done without injury to it. The usual recommendation is to put the fertilizer in bands at each side of the seed, about 2 inches from it and slightly below it. The fertilizer manufacturer goes through rather extensive manufacturing processes to make the plant food in the fertilizer more available. When the fertilizer is mixed all through the top layer of the soil, it tends slowly to be changed back to its original, less available forms. Keeping the fertilizer close to the seed slows up this process, the plants are able to use a greater percentage of the fertilizer and you get more returns per dollar spent.

Soil is more than just a lifeless mixture of various chemical elements. It has been shown that a cubic inch of good soil will contain as many bacteria as the entire human population of the country. Soils contain many particles so small that they cannot be seen under the

* A summary of a talk given by Dr. Richard Bradfield at a meeting of the vegetable and potato growers at Ithaca. Reprinted from "American Agriculturist."

highest powered miscroscope. As nearly as we can figure, the combined surface of all of the particles in a cubic inch of ordinary soil is equal to about an acre.

Preventing Losses

One source of losses in fertilizers, particularly of nitrogen, is leaching. The principal way to retard this loss is to have plants growing on the soil during the entire growing season. It has been shown that there is almost no leaching of nitrogen at any time when grass or a cover crop is growing on the soil. There is little leaching loss of phosphorus or potash at any time.

Another way to get the most from your fertilizer dollar is to use the fertilizer analysis best suited to your soil and to the crop you grow. It would be very helpful if there were some quick and easy way of determining the best analysis, but as yet it appears that field tests, while they may be slow, are the surest and best method of determining what fertilizer to use. Where fields need lime it is important to supply this lack in order to get the best results from commercial fertilizers.

Potash Consumption, 1939

The American Potash Institute, Inc., announces that deliveries of agricultural potash by its member companies within the continental United States, Canada, Cuba, Puerto Rico, and Hawaii during the fourth quarter of the calendar year 1939 amounted to 206,209 tons of actual K_2O, equivalent to 371,800 tons of potash salts. Constituting this total were 321,272 tons of muriate, 17,002 tons of manure salts, 21,114 tons of sulphate, 2,248 tons of sulphate of potash magnesia, and 10,164 tons of kainit. In addition, deliveries for chemical uses amounted to 12,071 tons of salts equivalent to 7,407 tons of K_2O. These figures include salts of domestic and foreign origin, exclusive of importations of potassium nitrate.

In terms of regional consignments, the total of 192,624 tons K_2O delivered within the continental United States was shipped as follows: Southern states (including Virginia) 123,587 tons; Mid-Western states 22,206 tons; Northeastern and Mid-Atlantic states 44,101 tons; and West Coast states 2,730 tons. The balance of 13,585 tons K_2O was delivered to Canada, Cuba, Puerto Rico and Hawaii.

For the calendar year 1939 deliveries of K_2O amounted to 365,055 tons, equivalent to 665,435 tons of potash salts, consisting of 552,174 tons muriate; 21,878 tons manure salts, 52,676 tons sulphate; 14,689 tons of sulphate of potash magnesia; and 24,018 tons kainit. Regional distribution on a K_2O basis was as follows: Southern states (including Virginia) 195,149 tons; Mid-Western states, 47,009 tons; Northeastern and Mid-Atlantic states, 78,118 tons; and West Coast states, 5,220 tons; the remainder 39,559 tons K_2O was delivered to Canada, Cuba, Puerto Rico and Hawaii. Deliveries of chemical potash amounted to 39,678 tons of salts representing 24,284 tons of K_2O. During the calendar year 1938 potash deliveries for agricultural use amounted to 883,536 tons of salts with a K_2O equivalent of 458,640 tons and for chemical uses 25,528 tons of salts equivalent to 15,585 tons K_2O. These figures, it will be observed, relate to deliveries, not consumption of potash salts.

Potash Deliveries

Short Tons K_2O
(United States, Canada, Cuba, Hawaii, Puerto Rico)

	Calendar Year 1939	Calendar Year 1938
Muriate	323,587	387,788
Manure salts	6,528	9,482
Sulphate	26,133	40,052
Sul.-pot.-mag.	4,073	4,828
Kainit 20 + 14%	4,734	16,490
Total agr.	365,055	458,640
Chem. potash	24,284	15,585
Grand Total	389,339	474,225
Southern (including Va.)	195,149	227,748
Mid-western	47,009	58,300
Northeast-Middle Atlantic States	78,118	102,812
West Coast	5,220	9,195
Canada, Puerto Rico, Cuba, Hawaii	39,559	60,585
Total	365,055	458,640

WISCONSIN FERTILIZER TONNAGE, 1939

Wisconsin fertilizer tonnage declined moderately in 1939, according to the report of W. B. Griem, State Chemist. Tonnage was off 8 per cent from 1938, but the decline in plant food was only 4 per cent. Comparative figures for the two years follow.

	1939	1938
Complete mixed goods	28,215	30,633
Phosphates with potash	7,658	7,231
Superphosphates	3,486	4,561
All others	3,264	4,008
Total	42,623	46,433
Average plant food content	24.98	23.81

Chilean Nitrate of Soda in 1939

Consumption of Chilean nitrate in the United States, which is largely for agricultural purposes, is expected to show a substantial increase in the current year, according to the annual review published today by the Chilean Nitrate Sales Corporation.

"World sales of natural Chilean nitrate of soda in the year ended June 30, 1939, were practically the same as in the previous year, amounting to 1,716,328 short tons," the review states. "Shipments to the United States, which is the largest single market, amounted to 630,436 tons.

"In the last World War, Chilean nitrate was used as a source of nitric acid in the manufacture of black powder and other explosives. Today, nitric acid is largely produced by other methods. Although nitrate of soda, at present, is not so important for military purposes, it is, of course, still subject to wartime increases in transportation, insurance and operating costs.

"As soon as the present war began, the Chilean Nitrate Sales Corporation announced that there would be no increase in its price during the current season and no lack of supply.

Today, Chilean Nitrate is selling at about 57 per cent of the level in 1926 (the year now taken as a base for most government price calculations); while the average index for farm products last year was about 65 per cent and for all commodities about 77 per cent."

Pointing out that in modern fertilizer practice the improvement of *quality* of product is beginning to be as important as the increase of *yield*, the review declares:

"We now understand that a man's health depends not only upon what foods he eats, but also on the quality of those foods; that is, whether or not they contain those minerals and vitamins which are essential to human health. This quality in turn depends upon the soil from which the foods are produced; that is, whether it contains the minor, but vital elements for the health and growth of plants. For example, two tomatoes that look exactly alike may be very different in nutritive content because they are grown in different soils, and one grapefruit is not necessarily worth as much as another in food value.

"The effectiveness of Chilean nitrate in increasing *yield* has long been demonstrated in cotton, corn, grains, tobacco, fruits, truck and other crops. Its contribution to *quality*, as expressed in terms of nutritive value, is also important. The unique property of Chilean nitrate is its vital element content. In addition to its quick acting nitrate nitrogen, it also contains a natural blend of small amounts of other plant food elements."

Farm Cash Income Increased in 1939

Farmers' total cash income from marketings, commodities placed under loan, and Government payments in 1939 amounted to $8,518,000,000, it is estimated by the U. S. Department of Agriculture. This compares with $8,081,000,000 in 1938, $9,111,000,000 in 1937 and $4,682,000,000 in 1932. With the exception of 1937, the 1939 income was the largest for any year since 1930.

There was an increase in 1939 over 1938 of 1.5 per cent in income from marketings which was due to increased income from crops, as income from livestock and livestock products was unchanged from a year earlier. Government payments reached a new high, amounting to $807,000,000 in 1939 against $482,000,000 in 1938.

While income from all crops was 4 per cent higher than in 1938 it was 10 per cent less than in 1936 and 16 per cent less than in 1937. Greatest percentage increases were in income from flaxseed, soybeans, sweet clover, and hops, reflecting increased production and slightly higher prices. Smaller increases were shown by corn, potatoes, apples, peaches, and pears. Income from cotton lint, tobacco, sugar beets, and sugar cane fell off.

The largest increase from 1938 to 1939 was in the West North Central States. Important fertilizer-using states which reported increased income included Maine, New York, New Jersey, South Carolina, Louisiana, Missouri, Ohio, Michigan, and California. Decreases occurred in Virginia, Georgia, Alabama, Mississippi, Kentucky, and Tennessee.

The index of prices received by farmers on January 15 was 99 per cent of the 1910-1914 level, the highest point reached since January, 1938. All groups of farm products were higher than a month earlier except chickens and eggs. Sharpest increases over a year ago were in grains, cotton and cottonseed, truck crops, and dairy products. Prices received for these products have an important effect on farmers' purchases of fertilizer. Pre-war parity between prices received by farmers and

prices they pay for fertilizer has been restored. Prices paid for all commodities, however, are only 79 per cent of parity. Indexes of prices received by farmers, based on pre-war as 100, follow: all farm products 94 a year ago and 99 now; grain, 66 and 90; cotton and cottonseed, 71 and 85; truck crops, 96 and 117; dairy products, 106 and 119.

Exports and Imports, 1939

In the first eight months of 1939 exports and imports of fertilizers and fertilizer materials were practically the same as in the corresponding period of 1938. In the final four months, following the outbreak of the war in Europe, exports were about 150,000 tons below the last four months of 1938 while there was a decline of 100,000 tons in imports. As a result of this recession, total exports and imports for the year were moderately below 1938.

Total exports in 1939 amounted to 1,395,000 long tons with a stated valuation of 17,141,000. Compared with 1938, there was a decline of of 11 per cent in tonnage but a 4 per cent rise in value. Export tonnage has been fairly well stabilized for the last five years.

Principal changes in 1939 exports, as compared with the preceding year, were: an upturn in ammonium sulphate; a sharp decline in other nitrogenous chemicals; smaller imports of phosphate rock, both hard rock and land pebble rock, with the total falling below a million tons for the first time in the last five years; another increase in superphosphate; and an increase in potash exports, to a new high level. Phosphate rock exports to Germany were 88,000 tons less than in 1938.

Imports were moderately lower in 1939, following a sharp decline in the preceding year. Totaling 1,449,000 long tons valued at $33,940,000 they were 7 per cent less than in 1938 in tonnage and 7 per cent less in value. Total imports in the 1935-1939 period averaged a half million tons a year less than in the 1925-1929 period.

Last year's drop in total imports was the result of the continued decline in potash salts as imports of nitrogenous materials were a little larger. In the nitrogenous group increases were registered by the natural organics, cyanamid and sodium nitrate, which more than offset moderate declines in several other materials. Potash imports were the lowest in many years, being only 30 per cent as large as in 1937.

United States Exports and Imports of Fertilizer and Fertilizer Materials by Classes—Total for All Countries—Long Tons

(Summarized by The National Fertilizer Association from Dept. of Commerce Preliminary Reports)

Exports

	Calendar Year		
	1939	1938	1937
Ammonium sulphate	46,664	30,716	73,916
Other nitrogenous chemicals†	111,575	158,621	123,008
Nitrogenous organic waste	12,542	19,153	18,219
Total nitrogenous materials	170,781	208,490	215,143
High-grade hard rock	132,983	181,920	120,478
Land pebble rock	816,023	958,921	932,324
Total phosphate rock	949,006	1,140,841	1,052,802
Superphosphate	95,224	90,237	78,949
Other phosphate materials	29,080	33,074	55,551
Total phosphate materials	1,073,310	1,264,152	1,187,302
Potash fertilizer materials	122,098	75,122	91,992
Concentrated chem. fertilizers	22,676	16,025	22,762
Prepared fertilizer mixtures	6,201	4,788	3,751
Grand Total	1,395,066	1,568,577	1,520,950

Imports

	Calendar Year		
	1939	1938	1937
Ammonium sulphate	110,761	120,837	82,853
Ammonium nitrate mixtures	65,710	67,497	66,420
Calcium cyanamid	132,698	119,120	123,417
Calcium nitrate	19,255	28,356	40,612
Guano	5,151	15,199	13,104
Dried blood	13,847	6,115	12,264
Sodium nitrate	604,390	577,130	628,792
Urea and calurea	836	1,817	2,410
Ammonium phosphates	34,995	29,028	27,253
Tankage	12,148	9,845	13,868
Castor bean pomace	22,830	14,735	13,469
Fish scrap and meal	12,024	6,965	20,743
Other nitrogenous materials	56,184	65,469	110,126
Total nitrogenous materials	1,090,829	1,062,113	1,155,331
Bone phosphates‡	78,176	22,966	41,755
Superphosphate—not over 20%	12,147	10,257	41,390
Superphosphate—over 20%	4,944	8,406	13,155
Superphosphate, ammoniated	147	90	3,385
All other phosphates	3,905	7,697	14,114
Total phosphate materials	99,319	49,416	113,799
Muriate of potash	84,301	199,378	372,930
Kainit, 14%	269	355	870
Kainit, 20%	18,385	53,407	115,224
Manure salts, 30%	1,855	8,187	40,097
Sulphate of potash	36,913	53,442	84,304
Sulphate of potash-magnesia	11,259	11,748	19,888
Nitrate of potash	8,449	13,249	32,404
Pot.-sodium nitrate mixtures	49,254	39,556	35,527
Other potash materials	133	164	228
Total potash materials	210,818	379,486	701,472
Nit-phos-pot. fertilizers	2,794	7,384	8,494
Other fertilizers	44,894	55,143	67,038
Grand Total	1,448,654	1,553,542	2,046,134

† Chiefly domestic synthetic sodium nitrate. ‡ Includes crude bones in 1939.

Employment in the fertilizer industry during December, 1939, was 10 per cent greater than during December, 1938, according to the U. S. Bureau of Labor Statistics. Payrolls showed an even greater increase, being 16 per cent larger than the previous December.

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PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

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NETHERLANDS FERTILIZER SUPPLIES CONSERVED

Because the Netherlands depends partly on imports for its supply of fertilizers, special measures have been taken since September, 1939 to divide the available stocks as evenly as possible over the entire trade. An inventory of stocks preceded a rationing of fertilizers, which, at the same time, aimed to obviate hoarding or war profiteering, and, for the pending proper enforcement of these measures, it was forbidden to transport or deliver artificial fertilizers during the period September 17th to October 7, 1939. On the latter date, however, rationing went into effect, and it was applied as much as possible to normal business channels for the purposes involved.

The import of potassium fertilizers, the consumption of which amounts to approximately 150,000 tons K_2O per annum, has so far been regular, and it may thus be expected that no market deficiencies will occur.

If raw material imports (pyrites and sulphuric acid) for the production of ammonium sulphate can continue uninterruptedly, the Netherland industry can cover completely its domestic supply of nitrogenous fertilizers. Imports of nitrogenous fertilizers, including Chilean nitrate are still continuing, but imports of cyanamide are meeting with considerable difficulty. Because of its weed-killing properties, efforts have been made to secure supplies from foreign sources.

Imports of basic phosphate slag justify the expectation of the availability of a sufficient supply. Superphosphate is made in The Netherlands, but it depends for its production entirely on the imports of pyrites and phosphate rock. Available supplies and the trend of imports so far presuppose that the needs for the season 1939-1940 are largely covered. Office of the American Commercial Attache, The Hague.

DEPARTMENT OF JUSTICE INVESTIGATION CONTINUES

The investigation of the fertilizer industry which is being conducted by the U. S. Department of Justice is being continued. Proceedings before a Federal Grand Jury were started during the week of February 12th at Winston-Salem, N. C. The records of a number of fertilizer manufacturers as well as those of The National Fertilizer Association have been subpoenaed.

OHIO FERTILIZER TONNAGE, 1939

Ohio fertilizer consumption in 1939 increased to 345,585 tons from 324,228 tons in the preceding year, according to the annual detailed summary compiled by the Department of Agronomy of the Ohio State University. Tonnage was somewhat under the 1937 peak, but with that exception was the largest on record. Mixed goods tonnage was practically as large in 1939 as in 1937, as brought out by the following tabulation.

The growing importance of 2-12-6 continued last year, with this grade accounting for 57.5 per cent of all mixed goods sold. The ratio was 48.8 per cent in 1937 and 17.8 per cent in 1929.

Consumption of nitrogen and potash reached new high points in 1939, but phosphoric acid consumption was well under 1936 and 1937. The average analysis of all fertilizers used in the state was:

1939.....	2.28-12.35-5.52	1937.....	2.16-12.95-5.02
1938.....	2.28-12.73-5.32	1929.....	1.97-13.60-4.00

Ohio Fertilizer Tonnage

	1939	1938	1937
Superphosphate:			
16-18%	5,462	7,495	11,752
20%	30,979	30,254	40,682
24-32%	2	...	223
40-46%	570	518	731
Total	37,013	38,267	53,388
Ammoniates	10,359	9,491	8,284
Other materials	5,656	5,542	7,236
Total materials	53,028	53,300	68,908
Mixed goods:			
2-12-6	168,293	149,997	143,143
0-14-6	22,059	18,454	21,421
2-12-2	20,833	25,925	41,526
2-8-10	7,972	7,944	6,149
4-24-12	6,392	6,103	6,148
0-12-12	5,441	2,701	1,807
3-10-6	4,961	5,509	5,480
3-18-9	4,909	4,273	2,753
2-14-4	4,904	4,702	6,031
81 other grades	46,793	45,320	58,800
Total mixed goods	292,557	270,928	293,258
Total tonnage	345,585	324,228	362,166
Total N	7,887	7,404	7,815
Total P_2O_5	42,697	41,262	46,901
Total K_2O	19,083	17,240	18,183

FERTILIZER ON TOBACCO

According to figures compiled by the U. S. Department of Agriculture and The National Fertilizer Association, the consumption of fertilizers in the growing of tobacco amounted to about 500,000 tons in 1938. Of this total, more than half was used in North Carolina. Applications varied from 2,386 pounds per acre in Massachusetts to 346 pounds per acre in Kentucky. In the results obtained from fertilizers, Tennessee showed an increase in tobacco grown of 1,818 pounds for each ton of fertilizer used. Other leading states were South Carolina, 1,643 pounds; Georgia, 1,558 pounds; Kentucky, 1,503 pounds; North Carolina, 1,421 pounds. The returns for each fertilizer dollar spent ranged from $4.10 in Massachusetts to $11.73 in South Carolina and $11.06 in Florida.

BRONZE CHAINS TO RESIST ACIDS

Link-Belt Company, Indianapolis, has issued an informative 4-page Folder No. 1804 on bronze drive and conveyor chains for resisting the destructive effect of organic and inorganic acids. A copy will be sent gratis to any reader upon request.

At a meeting of the Middle West Soil Improvement Committee held on February 1st, C. T. Brown, of the Federal Chemical Company, was nominated to the Board of Directors to fill the vacancy created by the death of A. S. Key. On the Executive Committee, R. P. Koos was elected to fill the unexpired term of Mr. Key.

The Use of Fertilizer on Tobacco and Its Economic Effect

State	1939 Tobacco Acreage	Tons of Fertilizer Used on Tobacco 1938	Estimated Yields Without Fertilizer	Estimated Yields With Fertilizer	Pounds of Fertilizer Applied per Acre	Pounds of Tobacco Produced by 1 Ton of Fertilizer	Value of Increased Yield per Dollar Spent for Fertilizer
Mass.	6,300	6,000	640	1,630	2,386	830	$4.10
Conn.	17,200	15,000	510	1,550	2,245	927	5.65
Md.	37,900	10,000	510	880	723	1,024	5.83
Va.	157,200	45,000	460	1,060	852	1,408	7.17
N. C.	738,000	291,000	370	1,060	971	1,421	9.13
S. C.	125,000	46,500	390	1,140	913	1,643	11.73
Ga.	105,200	42,000	360	1,110	963	1,558	10.42
Fla.	27,100	9,400	360	1,060	984	1,423	11.06
Tenn.	112,600	12,000	750	1,170	462	1,818	9.56
Ky.	370,200	24,000	690	950	346	1,503	9.02

Obituary

S. DABNEY CRENSHAW

S. Dabney Crenshaw, one of the organizers of the Virginia-Carolina Chemical Corporation, died on February 5th after a lengthy illness. He was 86 years of age.

While still a young boy, during the Civil War, he was a passenger on a vessel which ran the Union blockade, in order to join his father who was agent for the Confederate States in London. He was educated at Rugby and the University of Virginia and spent his active business career in the chemical industry in the South. For many years he was a vice-president of the Virginia-Carolina Chemical Corporation and was president of the Phosphate Products Corporation and some of its subsidiaries. He retired from active business life in 1935.

SULPHATE OF AMMONIA PRODUCTION FOR 1939

During the year 1939, the production of by-product sulphate of ammonia came to a total of 578,538 tons, according to the figures compiled by the U. S. Bureau of Mines. This is 32.4 per cent increase over 1938 production of 436,932 tons. During 1939, 24,104 tons (NH_3 content) of by-product ammonia liquor was produced, an increase of 18.4 per cent over the 20,363 tons output in 1938.

In comparison with previous years, the total by-product ammonia productions, figured in terms of sulphate of ammonia equivalent, was 674,954 tons in 1939. This was an increase over the 1938 production of 518,384 tons but less than the 753,164 tons in 1937 and the 709,485 tons in 1936. Peak production occurred in 1929, with 911,251 tons.

During December, 1939, production of by-product sulphate of ammonia came to 60,455 tons, compared with 59,745 tons in November, 1939, and 45,837 tons in December, 1938. Ammonia liquor output showed 2,449 tons (NH_3 content) in December, 1939; 2,431 tons in November, 1939; and 1,990 tons in December, 1938.

LINK-BELT PUBLISHES NEW CONVEYOR BOOK

A new 48-page copiously illustrated book, No. 1700, bedecked in red, white and blue, entitled "Link-Belt Conveyors in American Industry," has been published by Link-Belt Company, 307 N. Michigan Ave., Chicago.

Besides being a picture book of many different applications of mechanical elevating and conveying equipment for handling both packages and loose bulk materials, the book contains several pages of statistics and thought provoking matter on the theme that it is very largely the greater development and use of machines that has placed America in the forefront of all nations.

Credit is given to conveyors for helping American industry to produce more things for more people, at lower cost. Easy-to-understand charts show how much better the American worker fares than do workers of other countries. Says the book, "People can and do buy more here than anywhere else in the world because, with machinery, American industry is multiplying the purchasing power of wages."

Particularly recommended by Link-Belt as a book of ideas for any who are interested in handling raw materials, work in process, and finished goods of whatever sort, with greater facility and at lower cost, this book will be sent gratis to interested readers, upon request made on business letterhead.

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FERTILIZER MATERIALS MARKET

NEW YORK

Prospect for Spring Tonnage Encouraging. Greater Imports of Chilean Nitrate of Soda Reported. Most Material Prices Unchanged. Bag Prices Lower.

Exclusive Correspondence to "The American Fertilizer."

NEW YORK, February 13, 1940.

In spite of the recent freeze in the south, the reports of the possible discontinuance of British purchasing tobacco in this market and other disconcerting reports, nevertheless fertilizer manufacturers in general seem to feel that business in the new season will be at least equal to last season's sales.

According to a special survey in the Chilean Nitrate Sales Corporation's annual review, it is expected that the sale of Chilean nitrate in this market will show a substantial increase. It is interesting to note that the U. S. is the largest single market for Chilean nitrate—more than one-third of the total exports from Chile coming to this market, and for the year ending June 30, 1939, the exports to this market were over 630,000 tons.

Nitrate of Soda

Price unchanged, schedule price of $27.00 per ton in bulk, f.o.b. ports still prevailing.

Sulphate of Ammonia

For domestic use, price at ports remains at schedule of $28.00 per ton in bulk, but supplies do not seem to be as plentiful as a few weeks ago; in fact, there seems to be a scarcity for shipment to certain ports. Resale material for export is also becoming scarce.

Superphosphate

There is no apparent change in this market although it appears that on sales for export manufacturers are raising their ideas a trifle.

Potash

The market for domestic manufacturers is unchanged at 53½ cents per unit K_2O, per ton of 2,000 lb., in bulk, ex vessel Atlantic and Gulf ports, with ample supplies of both foreign and domestic material.

Nitrogenous Material

Supplies continue plentiful with practically no buying.

Dried Blood

The market on domestic blood is $3.25 ($3.95 per unit N) and 10, New York.

Tankage

Domestic material is being offered at $3.35 ($4.07 per unit N) and 10, Chicago. The New England production is reported as being offered at $3.20 ($3.89 per unit N) and 10, f.o.b., and South American is available at $3.40 ($4.13½ per unit N) and 10, c.i.f., ports.

Fish Scrap

There is no change to report. Menhaden meal is selling at the same price, that is, $58.00, Baltimore, and Japanese sardine meal at $51.00, c.i.f. ports.

Bags

The burlap market has continued to decline, which is reflected in still lower bag prices.

BALTIMORE

Manufacturers Well Covered for Spring Requirements. No Excess Sulphate of Ammonia on Market. Burlap Market Drops.

Exclusive Correspondence to "The American Fertilizer."

BALTIMORE, February 13, 1940.

Manufacturers in this section are getting ready for the spring fertilizer season and, having amply covered for their requirements of raw materials sometime ago, there is very little interest being shown in further supplies, and probably will not be until the shipping season is under way.

Ammoniates.—The market on feeding materials continues to ease up, and the nominal market on feeding tankage is about $4.10 per

A Complete Service

THE strategic factory locations of the American Agricultural Chemical Company, as shown on the accompanying map, assure prompt, dependable service for the complete line of products listed below.

We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Glue, Ground Limestone, Crushed Stone, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish, Blood and Tin-Tetrachloride. We mine and sell all grades of Florida Pebble Phosphate Rock.

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Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
East Point, Ga.
East St. Louis, Ill.
Greensboro, N. C.
Henderson, N. C.
Montgomery, Ala.
Norfolk, Va.
No. Weymouth, Mass.
Pensacola, Fla.
Pierce, Fla.
Port Hope, Ont., Can.
Presque Isle, Me.
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Searsport, Maine
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Houlton, Me.
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Montgomery, Ala.
Montreal, Quebec, Can.
New York, N. Y.
Norfolk, Va.
No. Weymouth, Mass.
Pensacola, Fla.
Pierce, Fla.
Port Hope, Ont.
Savannah, Ga.
Spartanburg, S. C.
Wilmington, N. C.
Havana, Cuba

unit of nitrogen, and 10 cents per unit of B. P. L., f.o.b. Baltimore. The demand continues light with only a little business passing.

Nitrogenous Material.—Due to lack of demand, the market has eased off further, and is now nominally about $3.10 per unit of nitrogen, c.i.f. Baltimore.

Sulphate of Ammonia.—There is no change in the situation except that neither first hands or second hands are taking on further business at the current schedule of $28.00 per ton of 2,000 lb., in bulk, f.o.b. Baltimore. There has been some export inquiry, but up to the present time very little actual business has developed.

Nitrate of Soda.—The position of this material is unchanged, and both domestic and imported brands continue firm in 100-lb. bags at $29.00 per ton of 2,000 lb., f.o.b. port warehouse, with usual differential for 200-lb. bags and in bulk.

Fish Meal.—There is no change in the price, and the market continues at $58.00 per ton of 2,000 lb. in bags, f.o.b. Baltimore, guaranteed 55 per cent protein.

Superphosphate.—Deliveries are now being made against contracts previously booked, and there are no offerings pressing on the market. The price continues firm and unchanged at $8.50 per ton of 2,000 lb., basis 16 per cent for run-of-pile, and $9.00 per ton of 2,000 lb. for flat 16 per cent grade, both in bulk, f.o.b. Baltimore, subject to change without notice.

Potash.—There is no change in the situation in this material, and it now looks as though there will be sufficient to go around for fertilizer manufacturers' normal requirements of both domestic and imported potash without any increase in price during the current season.

Bone Meal.—Buying interest is at a minimum and the markets are nominal. 3 and 50 per cent steamed bone meal is still quoted at $32.00 to $36.00 per ton, while 4½ and 47 per cent South American raw bone meal is quoted at $30.00 to $32.00 per ton, c.i.f. Baltimore, according to mechanical condition.

Bags.—The burlap market has eased up further, with result that the present price of plain, new, 10-oz. bags for spring delivery is about $120.00 per thousand, basis 40 cut 54 in., delivered Baltimore. Even on this reduced basis, there is very little business passing as most of the manufacturers have already covered for their spring bag requirements.

ATLANTA

Greater Interest as Shipping Season Approaches. Weather Hinders Business. No Shortage of Potash Expected.

Exclusive Correspondence to "The American Fertilizer."

ATLANTA, February 13, 1940.

With the spring fertilizer season now in the offing, buyers are beginning to take more interest in various materials than they have at any time since the post-war upturn in the early fall. Weather conditions in the South have been so bad, however, that business on the whole has been extremely quiet since Christmas. Now that the actual shipping season is near at hand, there will undoubtedly be considerable fill-in business on practically all materials over the next few months.

While there seemed to be a chance of a potash shortage some several months ago, in the meantime quite a volume of French potash has been shipped in all along the Atlantic seaboard, and this, coupled with the domestic supply, should be ample to take care of any and all requirements during the spring months. In fact, even now various resale lots are obtainable at less than the current scheduled price.

The markets generally are practically un-

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor :: Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

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changed from our last report and current quotations are as follows:

Tankage.—Fertilizer grade, $3.00 ($3.64½ per unit N) and 10 cents, Chicago; imported, $3.50 (4.25½ per unit N) and 10 cents, c.i.f.

Blood.—Domestic, $3.25 ($3.95 per unit N), producing points; foreign, $3.40 ($4.13½ per unit N), c.i.f.

Nitrogenous Tankage. — Domestic, $2.00 ($2.43 per unit N), Western producing points; imported, $2.60 ($3.16 per unit N), c.i.f. the ports.

Sulphate of Ammonia.—Unchanged.

Nitrate of Soda.—Spring shipments now commencing at importers' schedule of prices, in which there has been no change.

Fish Meal.—Imported, $50.00, Eastern ports. Menhaden unground scrap, $48.00, Carolina producing points.

Raw Bone Meal.—4½ and 45 per cent, $27.50, c.i.f.

Steamed Bone Meal.—$27.00, c.i.f.

Cottonseed Meal.—Prime 8 per cent, $29.00, basis Memphis; $31.00, Southeastern producing points.

WILMINGTON

Cottonseed Meal Prices Advance. Court Proceedings Hinder Spring Preparations. Shipping Season Retarded.

Exclusive Correspondence to "The American Fertilizer."

WILMINGTON, February 12, 1940.

Markets continue very quiet with little trading noted. A sharp advance in the cottonseed meal market (Memphis) during the past week has caused considerable wonder in this section, as there would appear to be little justification for this advance on the Memphis market, in view of the poor demand.

Fishing is over for the season, with practically all stocks at the plants depleted.

The recent subpoenas served on a number of the local offices to produce certain records in U. S. Court at Winston-Salem this week have been the principal topic of conversation, and there is much speculation as to how one can operate his business during the peak of the fertilizer season if his records are not available to him.

A break in the weather this week is expected to permit the movement of fertilizers and nitrate of soda in volume, as the movement to date is far behind previous years.

CHICAGO

Fertilizer Organic Prices Somewhat Lower. Better Buying Activity Expected. Feed Markets Lower.

Exclusive Correspondence to "The American Fertilizer."

CHICAGO, February 12, 1940.

The decline in feed materials has had some effect on fertilizer organics. The total tonnage offered, however, shows no increase, but demand from southern territory is lacking. Hope for buying activity from the south in the near future continues to persist in sellers' minds. Steamed bone meal is a shade lower, though still held too high to create much buying interest.

Markets in feed material have been decidedly lower, owing to low hog prices and curtailed country buying.

Nominal prices are as follows: High-grade ground fertilizer tankage, $2.90 to $3.00 ($3.52½ to $3.64½ per unit N) and 10 cents; standard grades crushed feeding tankage, $3.00 to $3.15 (3.64½ to $3.83 per unit N) and 10 cents; blood, $3.10 to $3.15 (3.77 to $3.83 per unit N); dry rendered tankage, 65 to 70 cents per unit of protein, Chicago basis.

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TENNESSEE PHOSPHATE

Shipments Continue in Volume in Spite of Weather. New Phosphate Company Organized. Fire in Sulphuric Acid Plant.

Exclusive Correspondence to "The American Fertilizer."

COLUMBIA, February 12, 1940.

Orders for prompt shipment keep coming in greater volume than usually expected at this time of year, and decided reduction of stocks on hand is evident. This presages great activity in mining operations as the weather becomes more propitious.

The small plant built near Gallatin in Sumner County by Carl Gilbreath for producing rock for TVA has been shut down for several weeks by the weather but expects to start operations again shortly.

The set of rumors that have applied to operations to be or about to be undertaken in development of phosphate mines in Williamson County south of Franklin, were renewed and revived to some extent by a visit recently by some New York parties heretofore reported in connection with the Harpeth Valley Chemical Co. On February 10th a charter of incorporation was issued by the Secretary of State, in Nashville, for the Maury-Williamson Phosphate Company, capitalized at $750,000 with $500,000 preferred stock, 6 per cent cumulative, and $250,000 common stock. The incorporators are listed as Curtis B. Dall of New York, Laurence B. Howard of Nashville, J. T. Ward and J. F. Eggleston of Franklin, being taken out by two Nashville attorneys, Ramsey Clayton and Frank Farriss, Jr. Dividends on the preferred stock begin to accrue April 1st, so the incorporators must anticipate rather profitable initial operations to begin very quickly.

If the lessons taught at the School for Fertilizer Salesmen held by Dr. Burlisson at Urbana, Illinois, in which it was very clearly brought out that the really profitable use of commercial fertilizer comes as a supplement to the program of rock phosphate, lime and legumes, is taken advantage of by the industry, and the possible three million tons per year of rock phosphate for this permanent agricultural program is used, several companies like the above will be needed to supply the rock, and the commercial fertilizer manufacturers will quickly more than treble the present tonnage.

Many of his friends in the fertilizer and phosphate industry will join with his army of local friends in Maury County in mourning the death of Judge Sam Holding late in January, from heart trouble, in his 74th year. Judge Holding was for many years Judge of the Circuit Court, and was attorney in many prominent phosphate and fertilizer cases. He was beloved by all who knew him.

Fire destroyed the sulphuric acid plant of the Read Phosphate Co. in Nashville last week, with estimated $100,000 loss.

N. F. A. LEAFLETS ISSUED

The National Fertilizer Association is preparing a series of leaflets dealing with the profits obtained by the use of fertilizers on the principal crops of the country. Four of these have been completed, the titles being "What Could You Do With $260.00 Extra Each Year," "11,000 Cotton Growers Say Fertilizer Pays," "12,500 Southern Corn Growers Say Fertilizer Pays," "2,700 Potato Growers Say Fertilizer Pays." Additional leaflets on Tobacco and on Corn in the Northern States will soon be issued. The leaflets are being sold in quantity to members of the Association for distribution to their customers and dealers. The price of the leaflets without imprint is $4.00 per thousand for the first "What Could You Do With $260.00 Extra Each Year," and $5.00 per thousand for each of the others.

NITROGANIC TANKAGE

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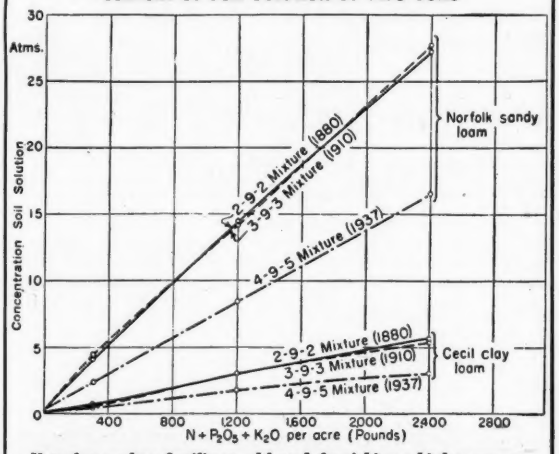
MODERN HIGH-GRADE FERTILIZERS CAUSE LESS "SALT INJURY"
than old-fashioned low-grade mixtures

WHITE AND ROSS, U. S. Department of Agriculture, in a recent article (Journal of Agricultural Research, **59**, 81-100)* point out that a high concentration of soluble salts near seedlings causes fertilizer injury. This has recently been emphasized by Hester (American Fertilizer, Vol. 91, No. 5).

Relative Influence of Typical Fertilizers As Formulated in 1880, 1910, and 1937 on Salt Content of Soil Solution of Two Soils



Note that modern fertilizers, although furnishing a higher proportion of nitrogen and potash, increase the salt content of the soil solution only 60% as much as old-fashioned fertilizers.

Fertilizer injury may be avoided by:

1—Proper placement.

2—Formulating fertilizers to give low salt concentration.

In their investigations, White and Ross determined the influence of equivalent quantities of different sources of nitrogen, phosphoric acid, and potash on the salt content of the soil solution. Their data show that some sources of nitrogen and potash increase the salt content of the soil solution more than six times as much as other sources of nitrogen and potash. Phosphates produce only slight increases in salt concentration.

The investigators indicate that the relatively low salt effect of modern fertilizers, as shown in accompanying diagram, is due to:

1. **Increased plant food content of the mixture whereby less fertilizer has to be applied per acre.**
2. **Replacement of kainit and other low-grade potash salts with high-grade muriate, and**
3. **Substitution in part of free ammonia for other soluble materials.** **A reprint will be sent on request.*

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*REG. U. S. PAT. OFF.

PASTURE NOTES

(Continued from page 7)

New York

White Clover. New York studies have shown that wild white clover added to bluegrass pasture increases the yield and uniformity of sod, adds to the protein content of the herbage, increases the nitrogen content of the soil, and reduces erosion.

Time for Pasture Improvement. The closer grazing of pastures which resulted during the recent drought has made an ideal condition for the commencement of a program of fertilizer treatment and good grazing management. Pasture must be near four inches in height and dense to provide maximum consumption. Use 100 to 800 pounds 20 per cent superphosphate on all pastures, and add 100 pounds potash per acre on light soils, plus lime as needed.—*D. B. Johnstone-Wallace, in The Dairyman's League News, October 10, 1939.*

North Carolina

Cattle Know What They Want. Livestock will balance their own ration if given the chance, and W. T. Morris, Youngsville, North Carolina, believes one way to do this is to add plenty of limestone and phosphate to all pastures, in addition to regular applications of complete fertilizer. This makes for better grazing and healthier animals. In a recent visit to the Upper Coastal Plain Branch Station, he noted that the cattle and other livestock there first ate the grass grown on fertilized plots. This is in line with observations by other farmers.—*From The Southern Planter, November, 1939.*

Ohio

Abused Crop. Many Meigs County, Ohio, pastures are the most abused part of the country's farm land. Livestock are turned out to harvest a crop that isn't there or can't grow under the ordinary circumstances. But pastures can be improved by a dollar's worth of fertilizers to return 200 pounds of beef or 2,000 pounds of milk per acre. Already 39 farmers are planning to improve their pastures this fall.—*Wesley Green, County Agent, Athens, Ohio.*

Rhode Island

Some Soil Removing Crops. The so-called soil-improving crops (red clover, alfalfa, hairy vetch, soybeans) remove more plant food from the soil than do the soil-depleting crops (oat hay, rye hay, Japanese millet). This is especially noticeable as far as nitrogen is concerned. R. S. Shaw, extension agronomist, points this out clearly and emphasizes that plant food should be supplied in excess of that removed by the so-called soil-improving crops.

South Carolina

Increase Mineral Content of Herbage. All minerals were relatively low on the unfertilized pastures in the Coxville sandy loam soil of South Carolina, the mineral content of the herbage often being too low for adequate nutrition of animals. Liming increased both the calcium and magnesium content of the carpet grass clippings, and the addition of superphosphate resulted in a marked increase in phosphorus and a perceptible increase in the calcium content of the grass.

Tennessee

Fifteen for One. In 1936, J. L. Snider, Johnson County, Tennessee, applied superphosphate at the rate of 48 pounds phosphorus per acre to a 10-acre clover field, leaving two untreated check plots. In 1937 and 1938, 19 tons more hay were cut from the treated area and in 1939 an estimated 15 bushels of additional corn per acre were produced. Using market prices, $18 worth of superphosphate has returned $280 in increased production in three years or 15 times the original cost.—*Tennessee Extension Service.*

Tennessee Farmers Report Pasture Improvement. In Johnson County, Tennessee, 50 farmers reported that their pastures would carry 590 head of cattle before phosphating and 1,184 head after phosphating. Forty-five reported that they could turn on pasture an average of 15 days earlier in the spring, and 43 reported that they could graze an average of 21 days later in the fall after treatment. One demonstrator reported 7 acres as showing no improvement; 36 reported 1,678 acres as twice as good; 12 reported 809 acres as three

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times as good; and 2 reported 73 acres as four times as good after treatment. Thirty-one farmers keeping beef cattle reported that their cattle were ready for market on an average 26 days earlier from phosphated than from untreated pastures. Nineteen farmers reported an average increase of 13.1 bushels per acre of corn on land which had phosphate applied to clover three years earlier in the rotation.—*From University of Tennessee press release November 13, 1939.*

VERMONT

Dried Grass Hay Valuable. Two trials indicated that cows receiving corn silage and a full allowance of immature artificially dried grass hay, but no grain, produced milk as efficiently as when fed silage, a limited quantity of the same quality hay, and a half allowance of grain, thus showing the possibility of lessening production costs.—*Vermont Station Bulletin 446.*

WEST VIRGINIA

Longer Grazing Season. The West Virginia Station reports marked increase in the number of pasture days and comparable gains in animal weight resulting from applications of lime and phosphates to lands that have sufficient topsoil to maintain bluegrass and white clover.

WISCONSIN

Bluegrass in Wisconsin. Moisture, fertilization, and cutting treatments were effective in the order named in determining the productivity of Kentucky bluegrass in Wisconsin experiments. Increases due to irrigation ranged from 43.6 per cent more forage without fertilizer to 125 per cent more on fertilized plats irrigated weekly. Fertilizers increased the average yield of dry matter 72 per cent on unirrigated land. There was a progressive decrease in yield, due to cutting, for all fertilizer and cutting treatments.

IDAHO FERTILIZER BULLETIN

The University of Idaho Agricultural Extension Division has recently published a pamphlet entitled "Progress Report of Phosphate and Other Fertilizer Investigations." Some of the subjects treated are: influence of age of alfalfa on results obtained from phosphate fertilization, comparison of rock phosphate with treble superphosphate, time of application, influence of treble superphosphate on red clover seed production, response of potatoes to fertilization, fertilizer placement studies on potatoes, nitrogen fertilization studies, effect of phosphate and manure in crop rotations, study on application rates of treble superphosphate, 1937 and 1938 investigations on various kinds of phosphate fertilizers, residual influence of fertilizers.

Copies of this bulletin may be secured by writing to the University of Idaho, Moscow, Idaho, asking for Experiment Station Bulletin No. 230.

CENSUS OF AGRICULTURE

Schedules are now being distributed by the Bureau of the Census for the quinquennial census of American agriculture. Information disclosed by these broad surveys is of considerable value to the fertilizer industry. Data on crop and pasture land by states and counties show actual and potential fertilizer markets. Information is also being collected on the amount of fertilizer used on each farm in 1939 and the amount spent for it. This will be the first time since 1929 that data will be available on fertilizer consumption by counties for all states.

BRAZIL ENTERS PHOSPHATE INDUSTRY

Brazil's first phosphate plant was recently opened at Ipanema, in the State of Sao Paulo. The plant has a 24-hour capacity of 250 tons of mineral with an output of 50 tons of 41 per cent concentrate. The existence of phosphate deposits in Sao Paulo has been known for a long time and plans for their development date back to 1929. In 1936 practical action was taken when the deposits were transferred from the Brazilian Ministry of War to the Ministry of Agriculture, the purpose being to market the product in the form of fertilizer.

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N. C. FARMERS ADVISED TO PLANT COTTON

In a recent statement, D. S. Coltrane, assistant to the Commissioner of Agriculture of North Carolina, advised the farmers of that state to plant the full quota of cotton allowed them by the present season's allotments.

"There were approximately 200,000 acres in cotton allotments that were not used last year according to the State AAA office," he commented. "Under the AAA contracts, there were some counties that lost as much as 1,000 acres in all allotments and losses will continue in other counties if growers fail to plant this season."

Coltrane said that "it has been demonstrated that cotton can be grown economically in North Carolina," citing that Cleveland, Lincoln and Hoke Counties averaged more than a bale to the acre.

"Much of the success of cotton-growing in this state depends upon the proper use of fertilizer, following approved methods of boll weevil control such as 'mopping' and the selection of the proper or most adaptable variety of cotton," he emphasized.

"Of course, it is essential to have a diversified agricultural program on each farm, but the tremendous decrease in tobacco acreage that will be made this year will leave many acres adaptable to the growing of cotton and many farmers are going to find themselves in sore need of additional revenue. Agricultural leaders will continue to call for more livestock and poultry on the farm, but the farmers and other leaders recognize that money from their cash crop can make it possible to initiate a more balanced farm program.

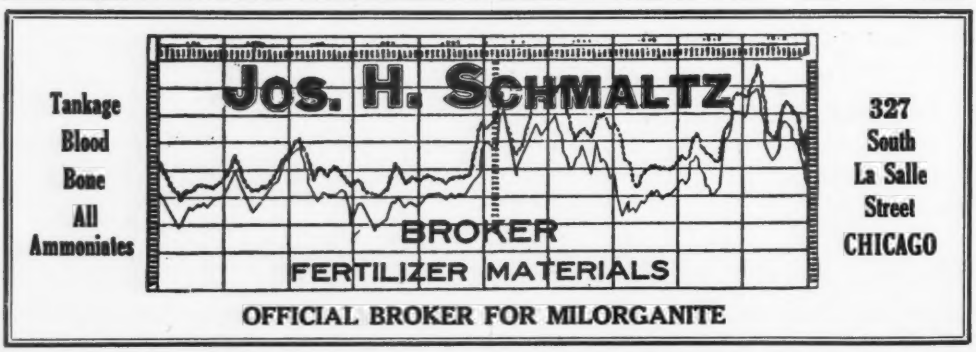
"Today, farmers in many section are faced with a possible loss of their cotton allotments if they fail to plant this year. Under the AAA, if a grower fails to plant his allotment during three years, he forfeits the allotment."

CHILEAN FERTILIZER CONTROL ESTABLISHED

An Act recently passed by the Chilean Congress creates a "Consejo de Fertilizantes" which will function as a National Fertilizer Board, with power to regulate the production, sale and use of fertilizer materials in Chile. The law applies to all imported fertilizers, as well as domestic products.

The Board which is composed of representatives of the government, banking, agriculture, railroads and material producers, is given the task to make detailed studies of the national situation with respect to the production and consumption of fertilizer materials, to advise the Government on the best means of increasing fertilizer production, to supervise all advertising and propaganda relating to fertilizer materials, to advise the Government on making contracts with fertilizer producers which are using raw materials or funds of the State, to control the working of the guano deposits, to take control of the working of state fertilizer properties, to approve all applications for credit that may be made to the Government by fertilizer producers, to subject to the Board's specific approval all fertilizers, domestic and foreign, sold in Chile so that it may be determined whether they fulfill the claims of the manufacturer.

In the future, any deposits of calcium carbonate, phosphates and potash salts found on Government property are reserved to the state and cannot be transferred to private ownership. In addition the President is given authority to declare privately owned deposits of fertilizer materials as being of public utility and, upon the advice of a committee of experts representing the Government and the owner of said deposits, to expropriate them for the benefit of the state, provided always that the state shall compensate the owner in accordance with existing laws.



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See Page 4

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A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

This list contains representative concerns in the Commercial Fertilizer Industry, Including fertilizer manufacturers, machinery and equipment manufacturers, dealers in and manufacturers of commercial fertilizer materials and supplies, brokers, chemists, etc.
For Alphabetical List of Advertisers, see page 33.

ACID BRICK
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

ACID EGGS
Chemical Construction Corp., New York City.

ACIDULATING UNITS
Chemical Construction Corp., New York City.

AMMO-PHOS
American Cyanamid Co., New York City.

AMMONIA—Anhydrous
Barrett Company, The, New York City.
Du Pont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA LIQUOR
Barrett Company, The, New York City.
Du Pont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA OXIDATION UNITS
Chemical Construction Corp., New York City.

AMMONIATING EQUIPMENT
Sackett & Sons Co., The A. J., Baltimore, Md.

APPARATUS—Laboratory
Sturtevant Mill Co., Boston, Mass.

AUTOMATIC ELEVATOR TAKEUPS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

BABBITT
Sackett & Sons Co., The A. J., Baltimore, Md.

BAGS AND BAGGING—Manufacturers
Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.
Fulton Bag & Cotton Mills, Atlanta, Ga.

BAGS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Fulton Bag & Cotton Mills, Atlanta, Ga.

BAGS—Paper
Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.

BAGS (Waterproof)—Manufacturers
Bemis Bro. Bag Co., St. Louis, Mo.
Fulton Bag & Cotton Mills, Atlanta, Ga.

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

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Atlanta Utility Works, East Point, Ga.
Bagpak, Inc., New York City.
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Sturtevant Mill Co., Boston, Mass.

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Bagpak, Inc., New York City.

BAG PILERS
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BEARINGS
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Sackett & Sons Co., The A. J., Baltimore, Md.

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Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

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Sturtevant Mill Co., Boston, Mass.

BOILERS—Steam
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Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City.

BONE PRODUCTS
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Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City.
Pacific Coast Borax Co., New York City.

BROKERS
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Bradley & Baker, New York City.
Burns & Company, L. D., Atlanta, Ga.
Huber & Company, New York City.
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Keim, Samuel L., Philadelphia, Pa.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

BUCKETS—Elevator
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For an Alphabetical List of all the Advertisers, see page 33

BUCKETS—For Hoists, Cranes, etc., Clam Shell, Orange Peel, Drag line, Special; Electrically Operated and Multi Power
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur
Chemical Construction Corp., New York City.

BURNERS—Oil
Monarch Mfg. Works, Inc., Philadelphia, Pa.

CABLEWAYS
Hayward Company, The, New York City.

CALCIUM-NITRATE
Synthetic Nitrogen Products Co., New York City.

CAL-NITRO
Synthetic Nitrogen Products Co., New York City.

CARBONATE OF AMMONIA
American Agricultural Chemical Co., New York City.
Du Pont de Nemours & Co., E. I., Wilmington, Del.

CARS—For Moving Materials
Link-Belt Company, Philadelphia, Chicago.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARTS—Fertilizer, Standard and Roller Bearing
Atlanta Utility Works, East Point, Ga.

CASTINGS—Acid Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS—Iron and Steel
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Sackett & Sons Co., The A. J., Baltimore, Md.
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Chemical Construction Corp., New York City.

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Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAMBERS—Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

CHEMICAL APPARATUS
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Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

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Baker & Bro., H. J., New York City.
Barrett Company, The, New York City.
Bradley & Baker, New York City.
Du Pont de Nemours & Co., E. I., Wilmington, Del.

CHEMICALS—Continued
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Wellmann, William E., Baltimore, Md.

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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CONCENTRATORS—Sulphuric Acid
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Fairlie, Andrew M., Atlanta, Ga.

CONDITIONERS AND FILLERS
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Burns & Company, L. D., Atlanta, Ga.

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Chemical Construction Corp., New York City.

COPPER SULPHATE
Tennessee Corporation, Atlanta, Ga.

COTTONSEED PRODUCTS
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Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

CRANES AND DERRICKS
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Link-Belt Speeder Corp., Chicago, Ill. and Cedar Rapids, Iowa.

CYANAMID
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
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Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Jett, Joseph C., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

DENS—Superphosphate
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Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DOUBLE SUPERPHOSPHATE (See Superphosphate—Concentrated)

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Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS
Sturtevant Mill Co., Boston, Mass.

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Jeffrey Mfg. Co., Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

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Sturtevant Mill Co., Boston, Mass.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

ENGINES—Steam
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corp., Chicago, Ill. and Cedar Rapids, Iowa.

FERTILIZER MANUFACTURERS
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Co., Columbus, Ohio.
International Agricultural Corp., New York City.
Smith-Rowland Co., Norfolk, Va.
U. S. Phosphoric Products Corp., New York City.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Burns & Company, L. D., Atlanta, Ga.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE
Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent
Link-Belt Company, Philadelphia, Chicago.

GELATINE AND GLUE
American Agricultural Chemical Co., New York City.

GUANO
Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable
Hayward Company, The, New York City.

HOPPERS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
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Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

IRON SULPHATE
Tennessee Corporation, Atlanta, Ga.

INSECTICIDES
American Agricultural Chemical Co., New York City.
Burns & Company, L. D., Atlanta, Ga.

LACING—Belt
Flexible Steel Lacing Co., Chicago, Ill.

LIMESTONE
American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers
Link-Belt Company, Philadelphia, Chicago.

MACHINERY—Acid Making
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

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Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

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MACHINERY—Tankage and Fish Scrap
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Bradley & Baker, New York City.
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Huber & Company, New York City.
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Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS
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Ashcraft-Wilkinson Co., Atlanta, Ga.
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Potash Co. of America, Baltimore, Md.
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U. S. Phosphoric Products Corp., New York City.

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TANKAGE
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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
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Schmaltz, Jos. H., Chicago, Ill.
Smith-Rowland Co., Norfolk, Va.
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Wellmann, William E., Baltimore, Md.

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Synthetic Nitrogen Products Co., New York City.

UREA-AMMONIA LIQUOR
Du Pont de Nemours & Co., E. I., Wilmington, Del.

VALVES—Acid-Resisting
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Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
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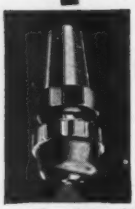

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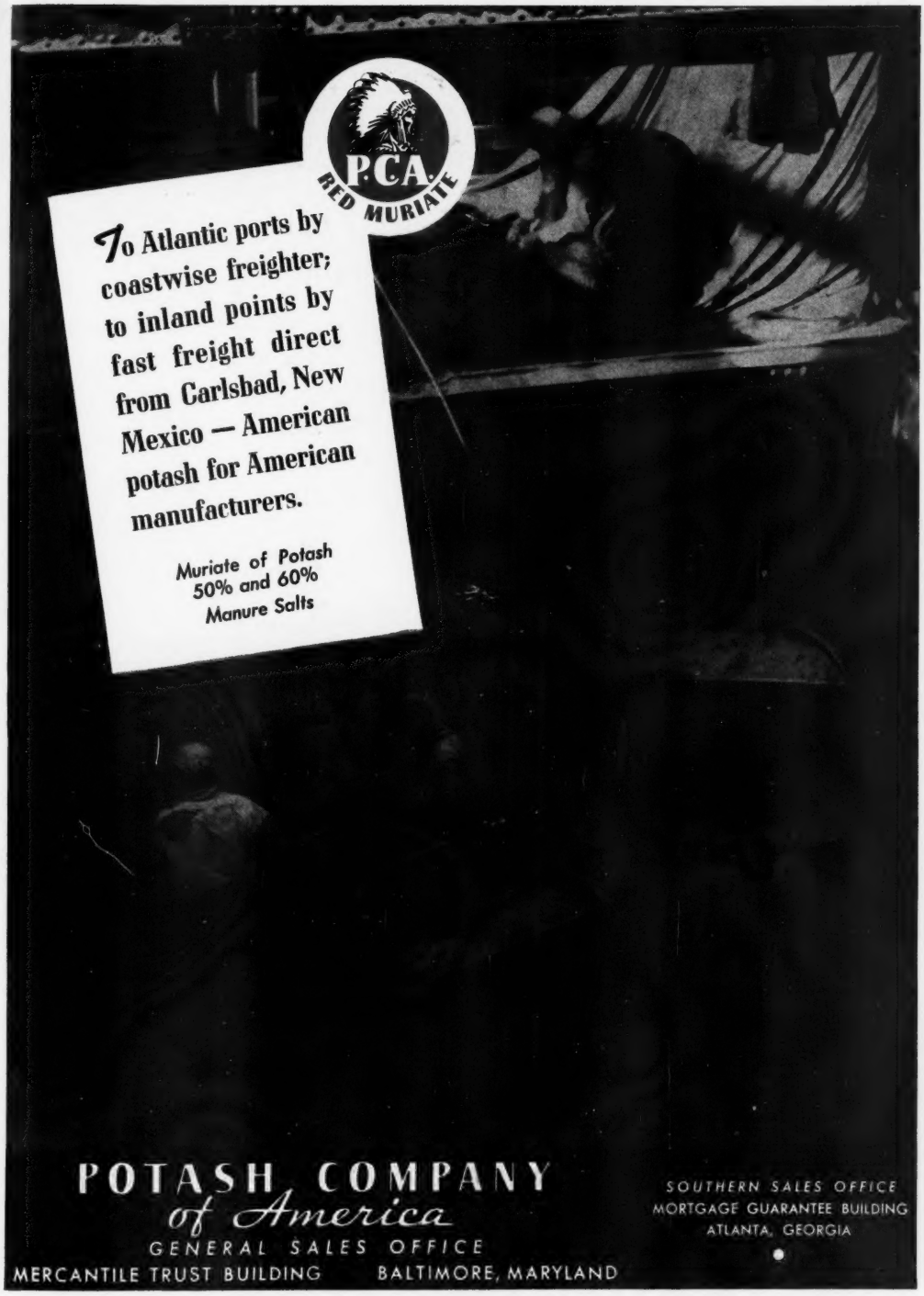
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